ABSTRACT OF THE DISCLOSURE

A method for finding optimal filter coefficients for a filter given an input data sequence and an objective function is disclosed. The method includes selecting a wavelet basis having k parameters and minimizes the k parameters according to the predetermined objective function. The wavelet basis is reparameterized into k/2 rotation parameters and factorized into a product of rotation and delay matrices. The k/2 rotation parameters are provided for the rotation matrices and a data transform matrix is computed based on the product of the rotation and delay matrices. The input data sequence is converted into transformed data by applying the data transform matrix to the input data. The Jacobian of the data transform matrix and the input data sequence is determined and multiplied by the gradient vector with respect to the transformed data of the objective function. This product is compared to a predetermined criterium and if the predetermined criterium is not satisfied, a new set of k/2 parameter values are provided and the gradient descent is continued until the optimal k/2 parameters are found. The optimal filter coefficients are then calculated based on the optimal k/2 parameters. The wavelet basis may be selected from a wavelet packet library containing orthonormal wavelet packet bases, and in which the selected wavelet packet basis is minimized according to a cost function, which can be an entropy function.

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